CSE 1242 - COMPUTER PROGRAMMING II
Programming Assignment # 2
DUE DATE: 03/05/2023 - 23:59 (No extension)

In this assignment, you should implement the following programs in C.

Q1. In this question, your program should take an integer, ***n***, and you will create an array of integers in the range [1, n]. Then, you should apply the following algorithm on the array:

- Starting from left to right, remove the first number and every other number afterward until you reach the end of the list.
- Repeat the previous step again, but this time from right to left, remove the rightmost number and every other number from the remaining numbers.
- Keep repeating the steps again, alternating left to right and right to left, until a single number remains.

Given the integer n, return the last number that remains in the array.

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Example 1:
Input: n = 9
Output: 6

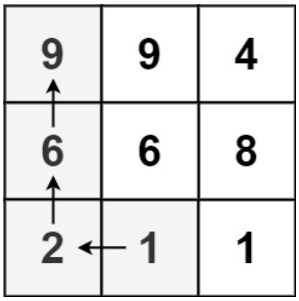
Explanation:
arr = [1, 2, 3, 4, 5, 6, 7, 8, 9]
arr = [2, 4, 6, 8]
arr = [2, 6]
arr = [6]

Example 2:
Input: n = 1
Output: 1
```

In this question, please implement the function that eliminates numbers in the array in two ways: (1) using **iteration** and (2) using **recursion**. In the main function, please invoke each of them for testing.

Q2. In this question, you are given an m x n integers matrix and you should return the length of the longest increasing path in the matrix. From each cell, you can either move in four directions: left, right, up, or down. You may not move diagonally or move outside the boundary (i.e., wrap-around is not allowed).

Example 1:



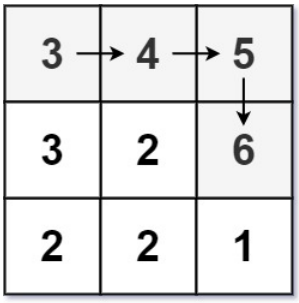
Enter number of rows: 3

Enter number of columns: 3

Enter input: matrix = 9 9 4 6 6 8 2 1 1

The longest increasing path is [1, 2, 6, 9] with visiting 4 cells.

Example 2:



Enter number of rows: 3

Enter number of columns: 3

Input: matrix = 3 4 5 3 2 6 2 2 1

The longest increasing path is [3, 4, 5, 6] with visiting 4 cells.

Submission Instructions

Please zip and submit your files using filename YourNumberHW2.zip (ex: 150713852HW2.zip) to Canvas system (under Assignments tab). Your zip file should contain the following 3 files:

1. C source code for Q1 (Pro2_1_150713852.c)
2. C source code for Q2 (Pro2_2_150713852.c)

Your program must include necessary comments with your own words to explain your actions!

Notes:

1. Write a comment at the beginning of each program to explain the purpose of the program.
2. Write your name and student ID as a comment.
3. Include necessary comments to explain your actions.
4. Select meaningful names for your variables and class names.
5. You are allowed to use the materials that you have learned in lectures & labs.
6. Do not use things that you did not learn in the course.
7. **Program submissions** should be done through the Canvas class page, under the assignments tab. Do not send program submissions through e-mail. E-mail attachments will not be accepted as valid submissions.
8. You are responsible for making sure you are turning in the right file, and that it is not corrupted in anyway. We will not allow resubmissions if you turn in the wrong file, even if you can prove that you have not modified the file after the deadline.
9. In case of any form of **copying and cheating** on solutions, all parts will get **ZERO** grade. You should submit your own work. In case of any forms of cheating or copying, both giver and receiver are equally culpable and suffer equal penalties.
   All types of plagiarism will result in zero grade from the homework.
10. No late submission will be accepted.
11. Please note that selected parts of your assignment will be graded!